



# MITRAL REGURGITATION REFERRAL TOOLKIT

## 1. Patient Case Summary Worksheets

Use these checklists to help collect all necessary patient information.

- Initial echocardiogram
- MR symptoms and related conditions
- Patient conditions that may impact therapy
- Physical exam results for MR and secondary impact
- MR defined diagnosis

## 2. MR Treatment and Referral Decision Worksheets

Use these worksheets to help determine what ACC experts advise as next steps for this patient (additional testing, follow-up and monitoring, or referral).

## 3. Clinical Next Steps Worksheets

Use these checklists to help record testing and next steps in treatment.

- Tests conducted so far
- Tests to be ordered
- Treatment considerations for this patient
- Treatment decisions for this patient

## 4. Referral Packet Checklist

Use this checklist to help track and compile all necessary information for an efficient and effective referral for a patient with MR.

## 5. Building MR Referral into your Electronic Medical Record Packet

Review this info sheet for best practices on integrating a referral process into your EMR system, and use the algorithm to help define what data points should trigger a referral for a patient with MR.

To provide feedback on this tool, go to: <https://www.surveymonkey.com/r/MRToolkitFB>



## 1. Patient Case Summary

Use these checklists to help collect all necessary patient information

Initial Echocardiogram	
<p><b>Specify primary reason</b> for initial echocardiogram</p> <p>E.g., patient symptoms or signs (e.g. new murmur, heart failure, palpitations, etc.) and clinical suspicion of pathology. Whenever possible, identifying the mechanism of MR from the echo report or images will help guide next steps in treatment.</p>	<p><b>Echocardiographic considerations</b></p> <p><input type="checkbox"/> Left ventricular enlargement</p> <p><input type="checkbox"/> Depressed ejection fraction</p> <p><input type="checkbox"/> Regional wall motion abnormalities</p>

MR Symptoms and Related Conditions	
<p><input type="checkbox"/> Heart failure (NYHA class ____)</p>	<p><b>Related symptoms</b> (Advanced heart failure symptoms should be queried in appropriate context)</p> <p><input type="checkbox"/> Exertional dyspnea</p> <p><input type="checkbox"/> Orthopnea</p> <p><input type="checkbox"/> Edema</p>
<p><input type="checkbox"/> Angina/Anginal symptoms</p>	<p><input type="checkbox"/> Atypical chest pain</p> <p><input type="checkbox"/> Angina</p> <p><input type="checkbox"/> Exertional or post-prandial atypical jaw/arm pain</p> <p><input type="checkbox"/> Dyspnea that may be anginal equivalent (diabetics)</p>
<p><input type="checkbox"/> Additional symptoms</p>	<p><input type="checkbox"/> Palpitations</p> <p><input type="checkbox"/> Increased fatigue</p> <p><input type="checkbox"/> Dry cough</p> <p><input type="checkbox"/> Dizziness/Syncope</p>
	<p><input type="checkbox"/> Other (please specify)</p>

Physical Exam Results for MR and Secondary Impact
<p>The systolic murmur of MR, as well as any associated auscultatory findings (click, s3,) will vary depending on the etiology, severity and context. Signs of heart failure and/or elevated PA pressures should be sought.</p>



Patient Conditions That May Impact Therapy	
<b>Comorbidities</b>	
<input type="checkbox"/> Atrial fibrillation	<input type="checkbox"/> Coronary artery disease (CAD)
<input type="checkbox"/> Cardiomyopathy <ul style="list-style-type: none"> <li><input type="checkbox"/> Postpartum</li> <li><input type="checkbox"/> Ischemic</li> <li><input type="checkbox"/> Non-ischemic dilated</li> <li><input type="checkbox"/> Hypertensive</li> <li><input type="checkbox"/> Hypertrophic obstructive</li> </ul>	<input type="checkbox"/> CAD risk factors (e.g. smoking)
	<input type="checkbox"/> Diabetes
	<input type="checkbox"/> Endocarditis
	<input type="checkbox"/> Hypercholesterolemia
	<input type="checkbox"/> Hypertension
<input type="checkbox"/> Obesity	
<input type="checkbox"/> Chronic kidney disease	<input type="checkbox"/> Peripheral or carotid artery disease
<b>Secondary Valve Pathology</b>	
<input type="checkbox"/> Aortic stenosis	<input type="checkbox"/> Aortic regurgitation
<input type="checkbox"/> Tricuspid regurgitation	
<b>Pulmonary Hypertension</b>	
<input type="checkbox"/> Ongoing diuretic or heart failure management required for symptom mitigation	



# MITRAL REGURGITATION REFERRAL TOOLKIT



MR Defined Diagnosis	
<b>MR Severity</b>	
<input type="checkbox"/> Mild	<input type="checkbox"/> Moderate
<input type="checkbox"/> Moderate to Severe	<input type="checkbox"/> Severe
<b>MR Type</b> <i>If not specifically stated in the echocardiogram report, general principles on how best to determine etiology of MR may include:</i>	
<input type="checkbox"/> <b>Primary MR</b>	Check all that apply: <input type="checkbox"/> Degenerative leaflet disease (often manifested by excess leaflet tissue) <input type="checkbox"/> Prolapse <input type="checkbox"/> Flail <input type="checkbox"/> Excess leaflet motion <input type="checkbox"/> eccentric or multiple jets of MR (may occur in patients with prolapse/flail) <input type="checkbox"/> Ruptured chordae <input type="checkbox"/> Vegetation <input type="checkbox"/> Rheumatic involvement
<input type="checkbox"/> <b>Secondary MR</b>	Check all that apply: <input type="checkbox"/> Central MR jets <input type="checkbox"/> Eccentric MR jets (often posteriorly directed and associated with abnormal posterior leaflet motion) <input type="checkbox"/> Relatively normal leaflet morphology (manifested by restricted leaflet motion below the annular plane, often secondary to non-leaflet ventricular disease such as previous infarction with remodeling or cardiomyopathy)
<i>If secondary MR is suspected:</i>	Use diagnostic testing to determine if it is of ischemic or non-ischemic origin by noting the presence of any of the following (see Considerations for Additional Testing table on page 5): <input type="checkbox"/> <b>Ischemic MR:</b> Suspicion of CAD (risk factors, prior MI, regional wall motion abnormalities, etc.) <input type="checkbox"/> <b>Other Secondary MR:</b> Infiltrative, hypertrophic, or dilated cardiomyopathy
<input type="checkbox"/> <b>Mixed MR</b>	Both Primary and Secondary mechanisms are present
<b>Symptom Status</b>	
<input type="checkbox"/> Symptomatic (presence of any signs or symptoms)	Has exercise test been done when appropriate? <input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Asymptomatic (complete absence of any signs or symptoms)	Does the asymptomatic patient have presence of any of the following? <input type="checkbox"/> EF $\leq$ 0.60 <input type="checkbox"/> LVESD $\geq$ 4.0cm <input type="checkbox"/> Recent Onset AF <input type="checkbox"/> PASP > 50 mm Hg <input type="checkbox"/> Serial increase in LV size or decrease in LV function over time

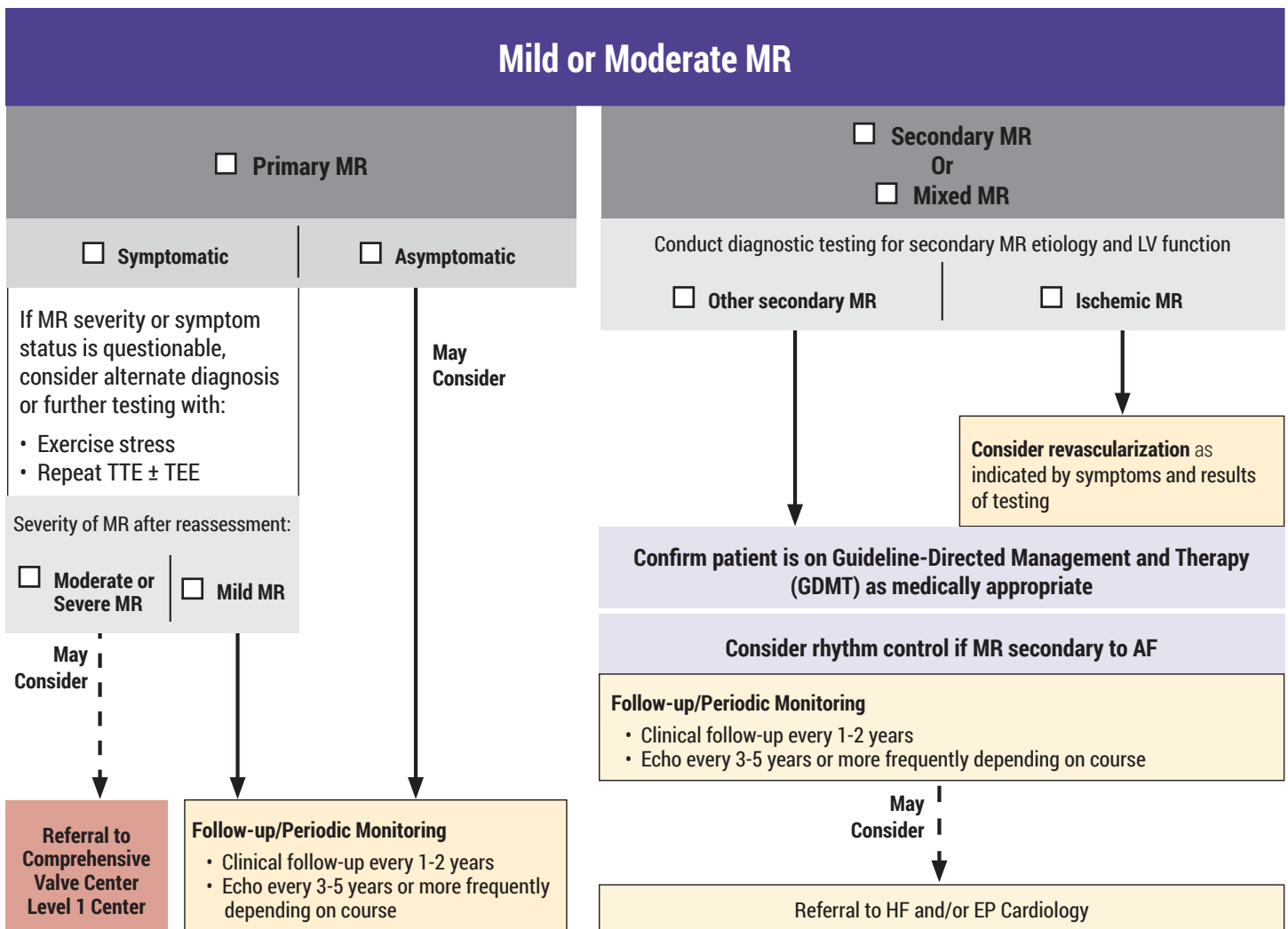


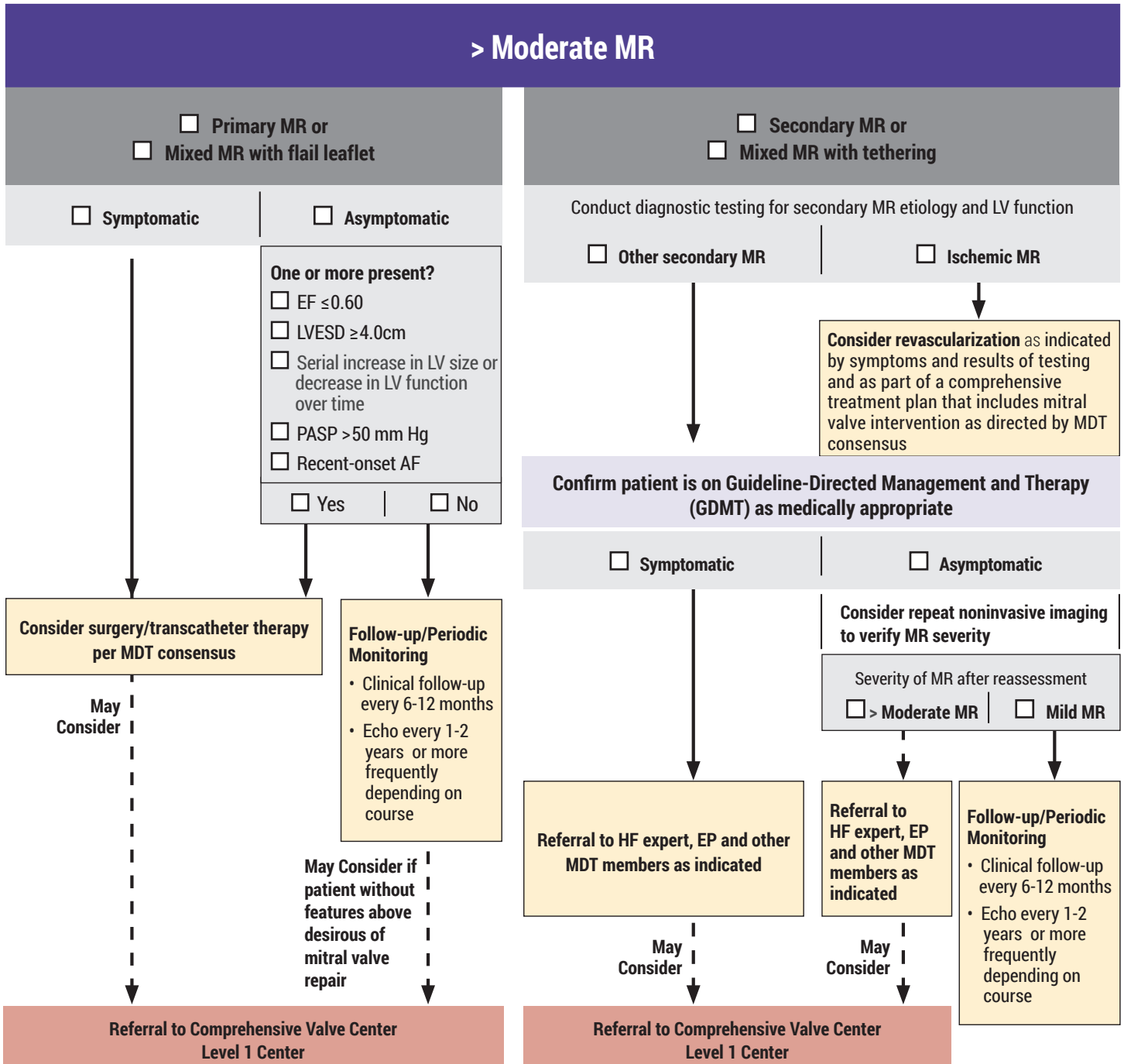
Considerations for Additional Testing		
MR Patient Profile	Testing Purpose	Suggested Testing as Appropriate
<ul style="list-style-type: none"> <li>Mild MR               <ul style="list-style-type: none"> <li>- secondary</li> </ul> </li> <li>Moderate to Severe MR               <ul style="list-style-type: none"> <li>- secondary or mixed</li> </ul> </li> </ul>	<b>Diagnostic testing for secondary MR etiology</b>	
	<ul style="list-style-type: none"> <li>Ischemic MR: Suspicion of CAD</li> </ul>	<ul style="list-style-type: none"> <li>Exercise test</li> <li>Non-invasive angiography</li> <li>Invasive angiography</li> <li>Cardiac MRI</li> </ul>
	<ul style="list-style-type: none"> <li>Other secondary MR</li> </ul>	<ul style="list-style-type: none"> <li>Serologies and other blood tests</li> <li>Cardiac MRI</li> <li>Endomyocardial biopsy</li> </ul>
<ul style="list-style-type: none"> <li>Moderate to Severe MR               <ul style="list-style-type: none"> <li>- secondary or mixed</li> <li>- asymptomatic</li> </ul> </li> </ul>	<b>Verification of MR severity or symptom status</b> (May consider)	<ul style="list-style-type: none"> <li>Repeat non-invasive imaging when indicated</li> </ul>
<ul style="list-style-type: none"> <li>Mild MR               <ul style="list-style-type: none"> <li>- primary</li> <li>- symptomatic</li> </ul> </li> </ul>		<ul style="list-style-type: none"> <li>Exercise test</li> <li>Repeat TTE +/- TEE</li> </ul>
<ul style="list-style-type: none"> <li>Mild MR               <ul style="list-style-type: none"> <li>- primary</li> <li>- asymptomatic</li> </ul> </li> </ul>		<ul style="list-style-type: none"> <li>TEE may identify lesions such as vegetations or flail segments not detected by TTE</li> </ul>



## 2. MR Treatment and Referral Decision Worksheets

Use these worksheets to help determine what ACC experts advise as next steps for this patient







## 3. Clinical Next Steps Worksheets

Use these checklists to help record testing and next steps in treatment

Tests Conducted:	Date Conducted and Other Notes	Test Results Attached to Referral?
<input type="checkbox"/> Initial TTE		<input type="checkbox"/>
<input type="checkbox"/> Repeat TTE		<input type="checkbox"/>
<input type="checkbox"/> Repeat TTE		<input type="checkbox"/>
<input type="checkbox"/> Stress Test – Echo		<input type="checkbox"/>
<input type="checkbox"/> Stress Test – Nuclear		<input type="checkbox"/>
<input type="checkbox"/> Angiography <input type="checkbox"/> Invasive <input type="checkbox"/> Non-invasive		<input type="checkbox"/>
<input type="checkbox"/> Cardiac MRI		<input type="checkbox"/>
<input type="checkbox"/> Endomyocardial biopsy		<input type="checkbox"/>
<input type="checkbox"/> Serology		<input type="checkbox"/>
<input type="checkbox"/> Other blood test (please specify)		<input type="checkbox"/>
<input type="checkbox"/> Other type of test (please specify)		<input type="checkbox"/>





# MITRAL REGURGITATION REFERRAL TOOLKIT



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Tests To be Ordered:	Date Ordered and Other Notes
<input type="checkbox"/> Repeat TTE	
<input type="checkbox"/> Repeat TEE	
<input type="checkbox"/> Stress Test – Echo	
<input type="checkbox"/> Stress Test – Nuclear	
<input type="checkbox"/> Angiography <input type="checkbox"/> Invasive <input type="checkbox"/> Non-invasive	
<input type="checkbox"/> Cardiac MRI	
<input type="checkbox"/> Endomyocardial biopsy	
<input type="checkbox"/> Serology	
<input type="checkbox"/> Other blood test (please specify)	
<input type="checkbox"/> Other type of test (please specify)	



Next Steps in Treatment		
<b>Considerations</b>		
<b>Determine patient's care goals</b> pertaining to the appropriateness of medical or interventional mitral therapy	<b>Discuss with patient:</b> <input type="checkbox"/> Goals and expectations <input type="checkbox"/> Patient preferences and values <input type="checkbox"/> Life expectancy	<b>Notes:</b>
<b>Establish and optimize patient's current medical therapy</b>	Blood pressure, heart rate/rhythm, and volume status	<b>Notes:</b>
<b>Identified Next Steps</b>		
<b>Guideline-Directed Management and Therapy</b>	Establish and optimize GDMT where medically appropriate. GDMT for heart failure or LV dysfunction is well established and includes the following as medically appropriate: <ul style="list-style-type: none"> <li><input type="checkbox"/> Treat hypertension</li> <li><input type="checkbox"/> Use diuretics for volume overload</li> <li><input type="checkbox"/> Consider cardiac device therapy (CRT, ICD) as indicated</li> <li><input type="checkbox"/> Provide anticoagulation for AF as indicated</li> <li><input type="checkbox"/> Consider rate vs. rhythm control strategies for AF as indicated</li> <li><input type="checkbox"/> Medical therapies for HFrEF may include:               <ul style="list-style-type: none"> <li><input type="checkbox"/> Beta-blockers</li> <li><input type="checkbox"/> ACEI or ARB or ARNI</li> <li><input type="checkbox"/> Nitrates + Hydralazine for African Americans or ACEI/ARB intolerance</li> <li><input type="checkbox"/> MRAs</li> </ul> </li> </ul>	
<b>Intervention</b>	<input type="checkbox"/> Revascularization for CAD <input type="checkbox"/> Mitral valve surgery	
<b>Follow-up/Periodic Monitoring</b>	<input type="checkbox"/> Next clinical visit <input type="checkbox"/> Follow up Echo	<b>Date:</b>
		<b>Date:</b>
<b>Referral</b> If choosing to refer, please see "Referral Packet checklist on pg. 11 for help"	<input type="checkbox"/> Referral to Electrophysiologist, Cardiologists or health facility? <input type="checkbox"/> Referral to a Comprehensive Valve Center (Level 1): A dedicated team of physicians skilled in the evaluation and management of MR that includes: <ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Requirements:</b> Dedicated valve team, access to advanced imaging, transcatheter and surgical valve therapies.</li> <li><input type="checkbox"/> <b>Team:</b> Valve expert, multi-modality imaging expert, HF specialist, interventionalist, MV surgeon, cardiac anesthesiologists, electrophysiologists and other specialists as needed (eg, stroke neurologist).</li> <li><input type="checkbox"/> <b>Benchmarks:</b> Mitral valve repair rates for primary MR, peri-operative stroke rate, and survival. Primary MR owing to isolated posterior leaflet disease should not be managed with mitral valve replacement unless a repair has been attempted and failed.</li> </ul>	



## 4. Referral Packet Checklist

Use this checklist to help track and compile all necessary information for an efficient and effective referral

**The following are attached with this referral:**

**Case Summary**

- Reason for initial echo
- Patient symptoms
- Classification of MR

**Patient Clinical Profile**

- Comorbidities
- MR-related conditions
- Summary of current medical therapy
- Patient preferences regarding treatment

**Testing History**

- List of tests performed (type and date)
- Results of those tests
- List of tests needed to be ordered

**Copies of Images**

- TTE
- TEE
- Coronary angiogram

**Patient Information**

- Patient Contact Information
- Patient Insurance
- Patient Medication List

**Referral Information**

- Referrer contact information – Institution and clinician
- Referred to Valve Center contact information – Institution and clinician



Patient Information	
<b>Name</b>	
<b>Age</b>	<b>Race and Ethnicity</b>
<b>Main Phone</b> [ ] [ ] [ ] - [ ] [ ] [ ] [ ] - [ ] [ ] [ ] [ ]	<input type="checkbox"/> Hispanic or Latino
<b>Cell Phone (if different)</b> [ ] [ ] [ ] - [ ] [ ] [ ] [ ] - [ ] [ ] [ ] [ ]	<input type="checkbox"/> American Indian or Alaskan Native
<b>Email</b>	<input type="checkbox"/> Asian
<b>Insurance Information</b>	<input type="checkbox"/> Black or African American
Insurance Company _____	<input type="checkbox"/> Native Hawaiian or Other Pacific Islander
Group # _____	<input type="checkbox"/> White
	<b>Address</b>
	Street _____
	City _____
	State _____ Zip _____

Patient Records
<b>Please indicate which of the following records are attached:</b>
<input type="checkbox"/> Copy of insurance card, front and back
<input type="checkbox"/> Medical record release authorization form
<input type="checkbox"/> Latest history and physical exam/office visit notes
<input type="checkbox"/> Procedural reports
<input type="checkbox"/> Provider and facility history



Patient Referral		
<b>Referring Facility</b>		
Name		
Street		
City	State	Zip
Phone #		
Email		
<b>Referring Physician</b>		
Name		
Type/Specialty		
Phone #		
Email		
<b>Facility Referred to</b>		
Name		
Street		
City	State	Zip
Phone #		
Email		
<b>Physician Contact</b>		
Name		
Type/Specialty		
Phone #		
Email		
<b>Nurse Coordinator</b>		
Name		
Phone #		
Email		



## Surgical Consultation

### Surgical Consultation 1

Name

Facility Name

Type/Specialty

Phone #

Email

### Surgical Consultation 2

Name

Facility Name

Type/Specialty

Phone #

Email



## 5. Building MR Referral into your Electronic Medical Record

Integrating any referral process into your electronic medical record system can ensure patient is referred when needed, save time in the referral process, and help ensure complete and consistent information is included in the referral.

**Use the MR Referral Algorithm and data points within this toolkit to help define within your EMR:**

1. What MR patient characteristics should trigger a suggestion for additional testing
2. What MR patient characteristics should trigger a referral, whether to a local EP or health facility, or comprehensive level 1 valve center
3. What information should be included with a referral for MR treatment

**Use the general best practices below to help integrate MR referral into your EMR successfully.**

<b>1. Identify current referral process difficulties and consider a provider's workflow when designing an electronic referral system</b>	Any new system is unlikely to be adopted if it is burdensome or intrusive. Identify any current problems or frustrations clinicians are facing with the current referral process, design your templates and systems specifically to address those problems, and make sure the system is incorporated within the current workflow rather than on top of it.
<b>2. Formalize, document, and maintain referral policies and procedures</b>	An electronic referral process is much more likely to be adopted and sustained if it is clearly defined. This includes specifying the roles and responsibilities of physicians, nurses, and administrative support throughout the referral process, defining the minimum standard information and format that should be included with each referral, and defining a follow-up and tracking process.
<b>3. Include all relevant clinicians and specialties in the design process</b>	Getting perspective and feedback from all parties who may be involved in the sending and receiving of a referral can help facilitate communication between specialties, clarify expectations and needs from everyone affected by the system, and ultimately reduce referral denials.
<b>4. Use standardized electronic referral templates</b>	Standardization of information between referring specialties helps providers know what to expect and has been shown to facilitate consistent and timely feedback as well as increase overall provider satisfaction.
<b>5. Include both structured and free text fields</b>	While templates help institute standardization, a good template should also allow some flexibility in documentation by including both structured and free text fields. For instance, a template might include a standardized checklist of symptoms, but also provide a free text field for further elaboration.
<b>6. Include a balance of required and optional fields</b>	Define clearly and up front what information is required for a successful referral in any given situation, and make those fields required. Make all non-essential fields optional. This helps ensure no necessary information is missed, while avoiding undue burden on the provider.
<b>7. Make "Reason for Referral" a required field</b>	Including a clearly stated reason for a referral is often overlooked, but has been shown to expedite the referral process. Including referral justification as a required field can help prevent this oversight.
<b>8. Take advantage of EMR data to prepopulate fields wherever possible</b>	One of the great advantages of building a referral template into an EMR system is the ability to prepopulate already-existing patient clinical and contact information. This will both save time and help ensure data accuracy and consistency across patient records.
<b>9. Consider an option to auto-populate "frequently referred to" facilities/ clinicians</b>	For any given clinical condition or situation, if there is a standard facility (i.e. Regional Heart Valve Center), specialist, or other clinician that is frequently referred to, consider adding an option that allows a user to auto-populate information about that facility (contact information, etc.) in the template.



<p><b>10. Track the who/what/when of each referral step</b></p>	<p>To more easily track and follow up on referral steps along the way, capture administrative data like who initiated the referral, what time and date each step of the process was carried out, etc.</p>
<p><b>11. Integrate capability to track referral status</b></p>	<p>A key aspect of referral efficiency is timely feedback on whether the referral was accepted or denied. Features that can help mitigate this issue include automatic notifications or record notes when a referral has been accepted or rejected, when additional information has been requested, or when a patient is a “no-show” to an appointment; and access to notes, encounters, orders, about a patient case across providers.</p>
<p><b>12. Include capability for informational consultations</b></p>	<p>In some cases, a clinician may only wish to consult with a colleague on a patient case, rather than actually transfer some aspect of that patient’s care to that provider. A comprehensive referral system should include features to facilitate and record the results of this type of consultation.</p>
<p><b>13. Facilitate real-time, clinician-to-clinician communication</b></p>	<p>Real-time communication between clinicians and specialist is often required at some point in the referral process. Including easy access to communication channels such as inter-facility chat systems, or contact information like phone numbers for commonly referred-to clinicians, within the EMR referral flow may facilitate this process.</p>
<p><b>14. Monitor, update, and improve your electronic referral process</b></p>	<p>Once an electronic referral process has been implemented, seek formal feedback from users on its success, and continue to refine the process as issues are identified. It may be helpful to set goals upon instating the electronic referral process (e.g., reduce number of referral rejections, reduce requests for missing information with referrals, etc.), and evaluate the process against these goals.</p>

Adapted from:

Esquivel, A. et al. Improving the Effectiveness of Electronic Health Record-Based Referral Processes. BMC Medical Informatics and Decision Making 2012, 12:107